SEMESTER END EXAMINATION, APRIL-MAY, 2026

Course Name: - B.Tech(ECE) **Semester:- IV**

Paper Name: - Analog & Digital Communication **Paper Code: - NEC401**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks.**

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठ प्रश्न)

5x3 =15

1. Answer all the following questions.

i) FM frequency band is
A. 88 to 108 MHz
B. 100 to 109 KHz
C. 108 to 110 GHz
D. None of above

ii) In AM, which parameter varies?
A. Frequency
B. Amplitude
C. Phase
D. Time

iii) Noise in communication is:
A. Desired signal
B. Undesired signal
C. Power
D. Frequency

iv) PCM includes:
A. Sampling
B. Quantization
C. Encoding
D. ALL

v) Bandwidth of digital signal depends on
A. Bit rate
B. Frequency
C. Voltage
D. Power

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions. **5x7=35**

i. The equation of amplitude modulated wave is $E_{am}(t) = 10 \cos 2\pi*10^6t + 5 \cos 2\pi*10^5t \cos 2\pi*10^6t + 3 \cos 2\pi*10^4t \cos 2\pi*10^6t$. Draw the spectrum of AM wave and find carrier power, sideband power and efficiency of system.

ii. Discuss the generation and detection of SSB-SC signals.

iii. Briefly explain FM demodulation using a Phase-Locked Loop (PLL).

iv. Explain the key elements of detection theory. What is meant by optimum detection of signals in noise? Describe the role of a decision threshold in binary hypothesis testing

v. Discuss the generation and detection of PAM signals.

vi. Explain the concept of pre-emphasis and de-emphasis in FM communication.

vii. A television signal with a bandwidth of 4.2 MHz is transmitted using binary PCM the number of quantization level is 512. Calculate code word length, transmission bandwidth, final bit rate, and output signal to quantization ratio.

Section – C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question. **2x10=20**

i) With the help of a block diagram, explain the operation of a binary Frequency Shift Keying (FSK) modulator and non-coherent demodulator. List two advantages and two disadvantages of FSK compared to PSK

ii) Briefly Discuss about the generation and detection technique of PCM

iii) Explain the generation and detection of Pulse Position Modulation (PPM) with suitable diagrams.

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